

Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R9WPSAgu

Gulf Coast Wet Pine Savanna

General Information

Contributors (additional contributors may be listed under "Model Evolution and Comments")

Modelers

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Reviewers

Vegetation Type

Grassland

Dominant Species*

ARBE7
PIPA2

General Model Sources

- Literature
- Local Data
- Expert Estimate

LANDFIRE Mapping Zones

55
46

Rapid Assessment Model Zones

- | | |
|--|---|
| <input type="checkbox"/> California | <input type="checkbox"/> Pacific Northwest |
| <input type="checkbox"/> Great Basin | <input type="checkbox"/> South Central |
| <input type="checkbox"/> Great Lakes | <input checked="" type="checkbox"/> Southeast |
| <input type="checkbox"/> Northeast | <input type="checkbox"/> S. Appalachians |
| <input type="checkbox"/> Northern Plains | <input type="checkbox"/> Southwest |
| <input type="checkbox"/> N-Cent.Rockies | |

Geographic Range

Gulf coast wet pine savannah occurs along the lower Gulf coastal plain from north central Florida to eastern Louisiana.

Biophysical Site Description

This PNVG occurs as wet woodlands or savannas growing on wet mineral soils, that are seasonally flooded (late winter to early spring) at least 2-3 times per decade.

Vegetation Description

Gulf coast savannas are characterized by a very sparse canopy dominated by longleaf pine (*Pinus palustris*), sometimes mixed with sparsely scattered cypress (*Taxodium* spp.) and/or slash pine (*Pinus elliottii*). In Mississippi in the mid-1800's, Hilgard described this PNVG as having scattered stunted longleaf (25 feet tall and generally less than 4 in dbh) with spacing of 50 feet between trees. There is generally little shrubby understory on reference condition sites, but a variety of hardwoods begin to encroach with infrequent and/or dormant season fire. The ground cover is dense and generally diverse. Grasses such as wiregrass (*Aristida beyrichiana*) (in the eastern part of the range), toothache grass (*Ctenium aromaticum*), and dropseeds (*Sporobolus* spp.), and grass-like species (such as *Cyperus* spp., *Juncus* spp., *Fimbristylis* spp. And *Dichromena* spp.) are dominant. Forbs, including many species of carnivorous plants, orchids, and composites are common and highly diverse, however, legumes are rarely present. The ground cover exhibits one of the highest small-scale (m²) species richness levels recorded for any habitat-type, worldwide. Unlike many other types of long-leaf pine communities, the distribution of trees is usually not strongly patchy. Instead, most trees are isolated, even as young individuals.

*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Disturbance Description

Gulf coast wet pine savannas experience frequent growing season surface fires, every 2-5 years, that generally burn across large expanses. The fires are usually low intensity overall, but will occasionally kill young individuals, and rarely kill older trees. Because this PNVG was originally very open, with only sparse trees, lightning and wind may have been major sources of tree mortality. A major effect of burning is to minimize the coverage of hardwood species (especially species such as black titi [Cliftonia monophylla]) that encroach from wetter adjoining areas. Periods of inundation may have been the dominant factor in keeping hardwoods in drier areas from encroaching. The primary disturbance dynamic is the gap phase regeneration of longleaf pine. The model classes are small patches widely dispersed on the landscape. A secondary dynamic (closed vs. open path) is the invasion of shrubs and hardwood trees in patches that escape fire. Once shrubs are established, they slightly decrease the probability of fire, but increase the probability that fires will kill the canopy pines. Once established, shrubs are not easily eliminated by single fires, but may sometimes be eliminated by multiple fires. We have simulated this by using mosaic fire to represent the last of a series of surface fires that eliminates invading hardwoods without killing canopy pines.

This vegetation type occupies much less of its original area and is now considered a habitat type of special concern due to the lack of fire and/or alteration of the hydrology. Many of the larger original areas have been permanently degraded by bedding (in attempts to establish pine plantations), and ditching or tiling to create drier areas for many types of uses including pastures and sod farms. Past establishment of plowed fire lanes may also slowly degrade the habitat by altering hydrology. Lack of fire has degraded much of the remaining areas. Uncharacteristic vegetation types include even-aged canopy stands in which age structure has been increased in density and/or homogenized by logging activities. Scattered longleaf have been replaced with dense stands of loblolly or slash pine. In addition, there are many areas where shrubs have become dense due to inadequate burning, and examples where the grass dominated ground cover has been lost due to soil disturbance or past canopy closure.

Adjacency or Identification Concerns

This PNVG is distinguished from other longleaf pine-dominated communities by the presence of wetland herbs and shrubs and seasonally fluctuating hydrology that, in some years, ranges from inundation to excessive drying that may produce cracking in the soil. It does not include the Gulf Coast flatwoods sites with saw palmetto (*Serenoa repens*) as a common species. Existing patches of savanna may be adjacent to large areas of Class B and E. Slight rises above the elevation of the savanna support mesic flatwoods. Wetter areas are pond cypress (*Taxodium ascendens*) or gum (*Nyssa* spp.) sloughs. Also hypericum (*Hypericum* spp.) ponds are found within this community.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Natural lightning initiated fires may have been on the scale of 50 - 50,000 acres, depending on conditions. The larger fires likely burned through savanna, flatwoods, cypress ponds, and may have crossed narrow sloughs if they were dry. The size of savanna patches was probably on the scale of 100 to 2,000 acres, but areas could have had more savanna separated by wet sloughs.

Issues/Problems

The VDDT model and description of Southern (Gulf Coast) Wet Pine Savanna was developed by Sharon Herman in 2004 and reviewed 3/7/2005 by Carl Nordman. The model was modified to reduce the frequency of fire in Class E, which resulted in Class E being 3% of the landscape rather than less than 1%. When the model is run without fire nearly all the vegetation comes out as Class B and Class E. This occurs on much of the current landscape, which is not managed with prescribed fire. Historical fire size (minimum, maximum, and average) was based on conjecture by Carl Nordman.

Model Evolution and Comments

Suggested reviewers - William Platt (LSU), Guy Anglin (USFS - Florida NFs Supervisors Office), Jean Huffman (FL DEP), Ann Johnson (FNAI)
 SWPS is the original FRCC code.

Several changes were made to the VDDT model as a result of the editorial review to ensure the information in the Modeltracker description and the model were the same. These changes included:

1. In classes A, B, C, and E, changing the age range of the classes to match the database description.
2. In Class A, changing the time since disturbance in the alternative successional pathway from A to B from 8 years to 15 years to match the starting age of Class B.
3. In Class A, changing the relative age for replacement fire event maintaining the class to -15 years.
4. In Class B, changing the primary succession pathway from B to E.
5. In Class B, removing the alternative successional pathway to E.
6. In Class D, changing the alternative succession pathway from B to E to correspond with the age class of the trees.

These changes resulted in minimal changes to the percentages contained within each class. Class E did increase from 1% originally to 7%. The overall fire frequencies did not change.

Succession Classes

Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 10%

Early1 All Structures

Description

Class A includes scattered pine regeneration up to 15 years old or no pine regeneration because no mast year has occurred since the gap opened. The native grassy ground cover is dominated by grass or grass-like species. Tree cover ranges between 0 to 25%. Replacement means death of the longleaf pines as single trees or small clumps. Most replacement fires occur in the earliest stage (class A). Older trees are very resilient to fire.

Indicator Species* and Canopy Position

ARBE7 Lower
 CTAR Lower

Upper Layer Lifeform

Herbaceous
 Shrub

Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	0%	100%
<i>Height</i>	Tree Regen <5m	Tree Short 5-9m
<i>Tree Size Class</i>	Sapling >4.5ft; <5"DBH	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant lifeform is the herbaceous component. Canopy closure ranges between 25-100% and is composed of medium height herbs, 0.5-0.9m tall.

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Class B 3%

Midl Closed

Description

Class B is characterized by scattered pines 15-75 years old, with a substantial component of mid-story hardwoods or shrubs encroaching in the absence of fire. Grasses and forbs are declining in cover and vigor. The hardwood/shrub cover is greater than 50%. Canopy pine cover generally is less than 25%. A secondary dynamic (closed vs. open path) is the invasion of shrubs and hardwood trees in patches that escape fire. Once shrubs are established, they slightly decrease the probability of fire, but increase the probability that fires will kill the canopy pines. Once established, shrubs are not easily eliminated by single fires, but may sometimes be eliminated by multiple fires. We have simulated this by using mosaic fire to represent the last of a series of surface fires that eliminates invading hardwoods without killing canopy pines.

Indicator Species* and Canopy Position

ILGL Middle
 ILCO Middle
 CLMO2 Middle

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 7**Structure Data (for upper layer lifeform)**

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	25 %	100 %
<i>Height</i>	Tree Regen <5m	Tree Medium 10-24m
<i>Tree Size Class</i>	Medium 9-21"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant lifeform are shrubs with a canopy closure between 50-100%, and heights ranging from a minimum of 1-2.9m and a maximum of greater than 3m.

Class C 35%

Midl Open

Description

Class C includes scattered pines 15-75 years old. There are few hardwoods and only sparse shrubs due to frequent fire. The ground cover is dominated by grass and grass-like species. The canopy pine cover generally is less than 25%.

Indicator Species* and Canopy Position

ARBE7 Lower
 CTAR Lower

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 2**Structure Data (for upper layer lifeform)**

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	0 %	25 %
<i>Height</i>	Tree Short 5-9m	Tree Medium 10-24m
<i>Tree Size Class</i>	Medium 9-21"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant lifeform is the herbaceous component. Canopy closure ranges between 25-100% and is composed of medium height herbs, 0.5-0.9m tall.

Class D 45%

Late1 Open

Description

Class D includes scattered canopy pines 75 or more years old, with few hardwoods and only sparse shrubs due to frequent fire. Grass and grass-like species dominate the ground cover. The canopy pine cover generally is less than 25%.

Indicator Species* and Canopy Position

ARBE7 Lower
CTAR Lower

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	25 %
Height	Tree Short 5-9m	Tree Medium 10-24m
Tree Size Class	Large 21-33"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant lifeform is the herbaceous component. Canopy closure ranges between 25-100% and is composed of medium height herbs, 0.5-0.9m tall.

Class E 7%

Late1 Closed

Description

Class E is characterized by canopy pines 75 or more years old, with a substantial component of hardwoods and/or shrubs in either the overstory or understory. Forbs and grasses are sparse. The hardwood/shrub cover is greater than 50%. The canopy pine cover generally is less than 25%. A secondary dynamic (closed vs. open path) is the invasion of shrubs and hardwood trees in patches that escape fire. Once shrubs are established, they slightly decrease the probability of fire, but increase the probability that fires will kill the canopy pines. Once established, shrubs are not easily eliminated by single fires, but may sometimes be eliminated by multiple fires. We have simulated this by using mosaic fire to represent the last of a series of surface fires that eliminates invading hardwoods without killing canopy pines.

Indicator Species* and Canopy Position

CLMO2 Mid-Upper
ILGL Middle
ILCO Middle

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 4

Structure Data (for upper layer lifeform)

	Min	Max
Cover	25 %	100 %
Height	Tree Short 5-9m	Tree Medium 10-24m
Tree Size Class	Medium 9-21"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Disturbances

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Non-Fire Disturbances Modeled

- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other:

Fire Regime Group: 1

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

Historical Fire Size (acres)

Avg: 5000
 Min: 50
 Max: 50000

Fire Intervals (FI):

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

	<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>
<i>Replacement</i>	165	10	500	0.00606	2
<i>Mixed</i>	500			0.002	1
<i>Surface</i>	3	1	10	0.33333	98
<i>All Fires</i>	3			0.34139	

References

Brown, James K. and Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.

Schmidt, Kirsten M., Menakis, James P., Hardy, Colin C., Hann, Wendel J. and Bunnell, David L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 p. + CD.

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, December). Fire Effects Information System, [Online]. Available: <http://www.fs.fed.us/database/feis/>.

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